

# **AN ANNOTATED LIST TO SCIENCE RESOURCES ON THE WEB**

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## ***Introduction***

*This annotated resource list was developed in response to an expressed need by King Drew Medical Magnet High School science teachers for curriculum-related, web-based science information that is reliable, up-to-date, and content and age-appropriate to the high school student. Aided through our year-long collaboration with National Library of Medicine through the Distance Learning Project, we were able to evaluate the best of the best available on the web, and in many instances this meant using NLM's vast network of resources. A pre-eminent resource for information in the sciences, NLM served as the standard in selecting all other websites. Before each site made it to these pages, we looked for these indicators of quality: Accuracy, Authority, Currency, and Coverage. (See Appendix: Criteria for Evaluating Internet Sites). This web resource is a work in progress as we will continue making revisions and additions to it as needed.*

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## **ENVIRONMENTAL SCIENCE**

### **Agricultural Health Issues**

- ***Genetically engineered/modified food***

National Agricultural Library's **AGRICOLA (AGRICultural OnLine Access)** is a bibliographic database of citations to the agricultural literature. The records describe publications and resources encompassing all aspects of agriculture and allied disciplines, including animal and veterinary sciences, entomology, plant sciences, forestry, aquaculture and fisheries, farming and farming systems, agricultural economics, extension and education, food and human nutrition, and earth and environmental sciences. Although the AGRICOLA database does not contain the materials, thousands of AGRICOLA records are linked to full-text documents online, with new links added daily. AGRICOLA is searchable on the World Wide Web.

<http://agricola.nal.usda.gov/>

- ***Pesticides***

The **Environmental Protection Agency's** Web site has a section on pesticides, including topics especially relevant to the consumer population. Sections include About Pesticides, Health and Safety, Environmental Effects, and Regulating Pesticides, each with a number of informative subsections.

<http://www.epa.gov/pesticides/>

### **Pollution-Related Health Issues (concerning Air, Water, and Soil pollutants)**

Here again, the EPA offers a one-stop shopping location for relevant Internet pages. Its Exposure page points to two principal resources: the Health Effects Notebook for Hazardous Air Pollutants, which describes the effects on human health of substances that are defined as hazardous by the 1990 amendments of the Clean Air Act; and the EPA's Integrated Risk Information System (IRIS), which summarizes available toxicity data and contains EPA's assessment of the ways in which the general public may be exposed to individual chemicals. A number of useful subtopics with links are also included.

<http://www.epa.gov/ebtpages/humaexposure.html>

### **Population and population Growth Issues**

- ***Local/National/International***

**Population Index** is the primary reference tool to the world's population literature. It presents an annotated bibliography of recently published books, journal articles, working papers, and other materials on population topics. This website provides a searchable and browse-able database containing 46,035 abstracts of demographic literature published in Population Index in the period 1986-2000." Site includes a user's guide and list of sources. From the Office of Population Research, Princeton University.

<http://popindex.princeton.edu/>

- ***More developed/less developed countries***

**The Population Reference Bureau** has been informing people about the population dimensions of important social, economic, and political issues. Its mission is to be the leader in providing timely and objective information on U.S. and international population trends and their implications.

<http://www.prb.org/>

- ***Birth control***

**UNFPA: the United Nations Population Fund** is the world's largest international source of funding for population and reproductive health programs. Since operations began in 1969, the Fund has provided nearly \$6 billion in assistance to developing countries. The Fund works with countries to help women, men and young people in the following areas: plan their families and avoid unwanted pregnancies; undergo pregnancy and childbirth safely; avoid sexually transmitted infections (STD's) including HIV/AIDS; and combat violence against women.

<http://www.unfpa.org/index.htm>

- ***Cultural beliefs impacting health issues***

The **EthnoMed** site contains information about cultural beliefs, medical issues and other related issues pertinent to the health care of recent immigrants to Seattle or the US, many of whom are refugees fleeing war-torn parts of the world.

<http://www.ethnomed.org/>

## Global Warming

- *The impact on the types, numbers, and distribution of diseases*

The EPA's site is a comprehensive resource for discussion of the causes and possible impacts of global warming, including on human health. This controversial subject is handled fairly and in great detail and includes a section on health impacts. However, global warming and its affects have been politicized and is a polarizing topic. Check out the Sierra Club's site, also listed below, on global warming for an opposing viewpoint. Be skeptical of any of the sites you chose for information on this topic.

<http://yosemite.epa.gov/oar/globalwarming.nsf/content/index.html>

<http://www.sierraclub.org/globalwarming/overview/>

## Ozone Depletion Impact on Health

- *Increase in skin cancer, cataracts, etc.*

The Center for International Earth Science Information Network (CIESIN), a center within the Earth Institute at Columbia University, specializes in interdisciplinary research related to human interactions in the environment, including the ozone layer depletion.

<http://www.ciesin.org/TG/HH/ozhlthhm.html>

## Health Issues Related to Non-native/Invasive Species

- *Africanized Bees, fire Ants, West Nile Virus, etc.*

**Invasivespecies.Gov.** is a gateway to Federal efforts concerning invasive species. Learn about the impacts of invasive species and the Federal government's response to the problem. Other information provided on this easy to use site are species profiles, geographic information (maps), news and events, laws and regulations and species specific databases. Articles are full-text and there are links to other agencies and organizations dealing with invasive species.

<http://Invasivespecies.gov/search>

**TeensHealth.org.** created by The Nemours Foundations Centers for Children's Health Media, TeensHealth, and KidsHealth, provides teens and families with accurate, up-to-date and jargon-free health information about children before birth and through adolescence. The 1,000's of in-depth feature articles, animations, games and resources are original and developed by experts in the health of children and teens. Articles are signed and dated with links to the author's medical affiliations.

<http://kidshealth.org/teen/khmisc/about.html>

**LA County West Vector Control District's** website is designed to educate the public about vector transmitted diseases, vector related injuries, and about the services it provides. Articles include information on such aspects of the species as where it originated, its habitat, biological structure, differences between the male and female, its life-cycle and posed health risks to humans.

<http://www.lawestvector.org/default.htm>

## Toxicology

- *Risk Assessment*

**National Library of Medicine's Toxicology and Environmental Health Program or TEHIP** maintains a comprehensive toxicology and environmental health [web site](#) that includes access to resources produced by TEHIP and by other government agencies and organizations. This web site includes links to databases, bibliographies, tutorials, and other scientific and consumer-oriented resources. TEHIP also is responsible for the [Toxicology Data Network](#) (TOXNET®), an integrated system of toxicology and environmental health databases that are available free of charge on the web. What follows are some of the databases available for searching via TOXNET:

**HSDB®** (Hazardous Substances Data Bank) is a comprehensive, scientifically reviewed, factual database containing records for over 4,800 toxic or potentially toxic chemicals. It contains extensive information in such areas as toxicity, environmental fate, human exposure, chemical safety, waste disposal, emergency handling, and regulatory requirements. The data are taken from a core set of monographs augmented with government documents, special reports, and primary journal literature.

**IRIS** (Integrated Risk Information System) is an online database built by the [Environmental Protection Agency](#) (EPA). It contains EPA carcinogenic and non-carcinogenic health risk assessment and regulatory information on over 500 chemicals. The risk assessment data have been scientifically reviewed by groups of EPA scientists and represent EPA consensus. IRIS also contains literature references.

**ITER** contains data in support of human health risk assessments. It is compiled by [Toxicology Excellence for Risk Assessment](#) (TERA) and contains over 600 chemical records. ITER provides a comparison of international risk assessment information in a side-by-side format and explains differences in risk values derived by different organizations. ITER data, focusing on hazard identification and dose-response assessment, is extracted from each agency's assessment and contains links to the source documentation.

**TRI** (Toxic Chemical Release Inventory) contains information on the annual estimated releases of toxic chemicals to the environment for the reporting years 1987-2002. This series of files is mandated by the Emergency Planning and Community Right-to-Know Act and is based upon data submitted to the EPA from industrial facilities around the country. Data include names and addresses of the facilities, and the amount of certain toxic chemicals they release to the air, water, or land, or transfer to waste sites. There is information on over 650 chemicals and chemical categories. Pollution prevention data is also reported by each facility for each chemical.

In addition to TOXNET, other toxicology and environmental health-related web resources available from TEHIP include:

**Tox Town** is an interactive guide to commonly encountered toxic substances, your health, and the environment. It uses color, graphics, sounds and animation to convey connections between chemicals, the environment, and the public's health. The City or the Town neighborhoods are designed to provide facts on toxic chemicals found in everyday locations, information about how the environment can impact human health, non-technical descriptions of chemicals, links to authoritative chemical information on the Internet, and Internet resources on environmental health topics. Tox Town's target audience is students above elementary-school level, educators, and the general public. It is a companion to the extensive information in the TOXNET collection of databases that are typically used by toxicologists and health professionals. Tox Town also offers some resources in Spanish (<http://toxtown.nlm.nih.gov/espanol/>).

**Household Products Database** is a resource that provides information on the potential health effects of chemicals contained in more than 4,000 common household products used inside and around the home. The database allows users to browse a product category, such as 'Pesticides' or 'Personal Care,' by alphabetical listing of brand names. Products can also be searched by type, manufacturer, product ingredient/chemical name and by health effects. The record for each product shows the ingredients as reported in the manufacturer's Material Safety Data Sheet (MSDS) and includes other information such as handling, disposal, and health effects.

**Haz-Map®** is an occupational toxicology database designed primarily for health and safety professionals, but also for consumers seeking information about the health effects of exposure to chemicals at work. It links jobs and hazardous tasks with occupational diseases and their symptoms. The approximately 1,000 chemicals and biological agents in the database are related to industrial processes and other activities such as hobbies. The linkage indicates the potential for exposure to the agents. The 180 occupational diseases and their symptoms are associated with hazardous job tasks. This association indicates an increased risk for significant exposure and subsequent disease.

**TOXMAP** is a web site from the National Library of Medicine (NLM) that uses maps of the United States to show the amount and location of toxic chemicals released into the environment. Data is derived from the EPA's Toxics Release Inventory ([TRI](#)), which provides information on the releases of toxic chemicals into the environment as reported annually by industrial facilities around the United States.

<http://sis.nlm.nih.gov/Tox/ToxMain.html>

**Environmental Protection Agency (EPA's)** main website provides the most current information on its goals of conserving water and energy, minimizing greenhouse gases, slashing toxic emissions, re-using solid waste, controlling indoor air pollution, and getting a handle on pesticide risks. The EPA's link to its educational resources has separate areas for kids, primary and secondary students, and teachers, each with its own design, age-appropriate content, and tone.

<http://www.epa.gov/>

## Nuclear Energy and Health Issues

- *Radiation Exposure*

**Tennessee Valley Authority (TVA)** is the nation's largest power company. Their website provides a clear explanation of nuclear and other forms of energy, how each works, and any safety issues associated with using them.

<http://www.tva.gov/power/nuclear.htm>

- *Chromosomal Ramifications of Radiation Exposure*
- *Fetal Exposure*

**Medline Plus** is a goldmine of good health information from the world's largest medical library, the National Library of Medicine. Health professionals and consumers alike can depend on it for information that is authoritative and up to date. MedlinePlus has extensive information from the National Institutes of Health and other trusted sources on over 700 diseases and conditions. From its main menu users can access Drug Information, an illustrated Medical Encyclopedia, a Dictionary of medical words, Health news from the past 30 days, Directories to doctors, dentists, and hospitals as well as other resources. The site is easy to use and articles on health topics are clearly arranged.

<http://www.nlm.nih.gov/medlineplus/medlineplus.html>

## BIOLOGY

### *Diseases*

- *Antibiotic Resistant Diseases*

Comprehensive site from the Division of Microbiology and Infectious Diseases, **National Institute of Allergy and Infectious Diseases (NIAID)** provides an overview of antibiotic resistant diseases, their evolution, treatment problems, and links to a variety of useful resources.

<http://www.niaid.nih.gov/dmid/antimicrob/>

Fact sheet provided by the National Institute of Allergy and Infectious Diseases which outline the growing problem of multi-drug resistant diseases, their causes, and research being conducted.

<http://www.niaid.nih.gov/factsheets/antimicro.htm>

**American College of Physicians** health education pages for adults with discussion of the problem and two handy videos that can be viewed on a computer.

[http://www.doctorsforadults.com/topics/dfa\\_anti.htm](http://www.doctorsforadults.com/topics/dfa_anti.htm)

- *Autoimmune Diseases (increasing numbers, female vs. male)*

National Library of Medicine's MedlinePlus, a consumer health information portal, is an excellent place to start to learn about the group of diseases classified

as autoimmune diseases. Key in the term, “autoimmune diseases” to get an overview with links to a variety of resources and a more in-depth look at such autoimmune diseases as lupus, rheumatoid arthritis, myositis, and autoimmune hepatitis.

<http://search.nlm.nih.gov/medlineplus/>

- ***“Species-Jumping” Diseases (SARS, Bird Flu, etc.)***

Also known as zoonotic diseases, they represent diseases that spread from animals to humans. The **University of Wisconsin’s School of Veterinary Medicine** maintains a tutorial with voluminous links to specific zoonotic disease. Included for each disease are a brief review of the microbiology of the etiologic agent; descriptions of the clinical presentations in both animals and humans; information related to diagnosis, treatment and control in animals; and selected references. Links to other organizations and general information on the topic follows.

<http://www.vetmed.wisc.edu/pbs/zoonoses/>

The **Centers of Disease Control** has a comprehensive site on this subject with links to other resources providing an overview of the subjects. The site is rich with links to information about specific types of diseases spread by animals.

<http://www.cdc.gov/ncidod/dpd/parasiticpathways/animals.htm>

- ***Development of New Diseases/Return of “Old” Diseases (i.e.: new=HIV or Ebola; old=small pox)***

The Emerging Diseases page offered by the National Institute of Allergy and Infectious Diseases offers a variety of information links to resources on this topic. Especially strong are the page’s sections on fact sheets on emerging diseases, news releases tracking developments in this area, and listing of other relevant publications. The research section cites funding opportunities and current research being conducted around the globe on emerging and reemerging diseases.

<http://www.niaid.nih.gov/dmid/eid/#resources>

**CDC’s National Center for Infectious Diseases** provides a page of links to external resources on emerging diseases. While the sections listing “articles, lectures” and “programs, networks” are information-rich, the other sections, including journals and agency listings are just top level links to those resources without any focus on emerging/reemerging diseases.

[http://www.cdc.gov/ncidod/id\\_links.htm](http://www.cdc.gov/ncidod/id_links.htm)

## **HIV/AIDS Issues**

Created by the Department of Health and Human Services, **The AIDS Info** portal, one of the more comprehensive sites discussing Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS), has a page directed at high school students seeking more information about this disease.

<http://aidsinfo.nih.gov/other/students.asp>



Click on the AIDS Info graphic at the top of the page and you will be led back to the back page which has links for educators, researchers, and clinical practitioners.

## Genetics

- ***DNA Sequencing***

Probably the best place to start to gather information on this complex topic is the **National Center for Biotechnology Information (NCBI)**, an arm of the National Library of Medicine. A national resource for molecular biology information, NCBI creates public databases, conducts research in computational biology, develops software tools for analyzing genome data, and disseminates biomedical information - all for the better understanding of molecular processes affecting human health and disease. The “About NCBI” section provides an overview of the activities on this unit; the impact and place of Bioinformatics on genomic research; an introduction to Entrez, NCBI’s database search and retrieval system for accessing genomic information; and an excellent primer on genetics and gene mapping; and sections describing the various databases and resources making up the Entrez system.

<http://www.ncbi.nlm.nih.gov/>

- ***Chromosomal anomalies***

Excellent site to visit to gain a basic understanding of chromosomal abnormalities. Simple text explanations with good graphics. Good overview section and sections on autosomal and sex chromosome abnormalities. Flash cards and crossword puzzles for review. Good links to other informative sites on this subject. Created and maintained by Dr. Dennis O’Neil, Behavioral Sciences Department, Palomar College, San Marcos, California

<http://anthro.palomar.edu/abnormal/default.htm>

Once you understand the basics, a good place to explore specific chromosomal defects is the OMIM, **Online Mendelian Inheritance in Man**, is a database catalog of human genes and genetic disorders authored and edited by Dr. Victor A. McKusick and his colleagues at Johns Hopkins and elsewhere, and developed for the World Wide Web by the National Center for Biotechnology Information (NCBI). The database contains textual information and references. It also contains copious links to MEDLINE and sequence records in the Entrez system, and links to additional related resources at NCBI and elsewhere.

<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=OMIM>

- ***Stem Cell Research***

A good place to start is the **Stem Cell Information** site created by the **National Institutes of Health**, particularly its information center which has sectioned on stem cell basics, the state of research in this area, an FAQ section, and the ethical issues surrounding stem cell research. Links to other resources are valuable for continued exploration of this topic.

<http://stemcells.nih.gov/info/>



To understand the current ethical debate surrounding stem cell research, check out U.S. News & World Report's special Web pages devoted to "The Science, Politics and Ethics of Stem Cell Research." Sections include U.S. News articles covering the growing debate, the key players, government action on the issue, statements and hearings, and useful links to other resources covering the debate.  
<http://www.usnews.com/usnews/briefings/stemcell0701.htm>

### Dissections

A number of online dissection sites exist on the Internet. "Google" them by typing +"online OR virtual" +dissections in the search box. Watch out for sites ending in .com, as these refer to commercial sites that are often just advertising dissection media and products that they are trying to sell. Better to stick with sites ending in .edu or .org. Quality varies markedly from site to site. A small sampling of available sites follows:

Clam dissection from **Cornell's Introductory Biology Sequence**:

[http://biog-101-104.bio.cornell.edu/BioG101\\_104/tutorials/animals/clam.html](http://biog-101-104.bio.cornell.edu/BioG101_104/tutorials/animals/clam.html)

Sheep brain from the **Exploratorium**, San Francisco:

<http://www.exploratorium.edu/memory/braindissection/index.html>

Virtual worm from **NatureWatch**, a collaboration of Canadian agencies:

[http://www.naturewatch.ca/english/wormwatch/virtual\\_worm/index.html](http://www.naturewatch.ca/english/wormwatch/virtual_worm/index.html)

**Visible Human Online Dissectors/Browsers** are accessible from the **Visible Human Home Page** at the National Library of Medicine allowing users to view cross sections of human male and female adult anatomy (see AnatLine, AnatQuest and the link to Applications for Viewing the Images):

[http://www.nlm.nih.gov/research/visible/visible\\_human.html](http://www.nlm.nih.gov/research/visible/visible_human.html)

### Post 9/11 Issues

- ***Health concerns/responses to biological and chemical weapons***

Here again, the **National Library of Medicine's MedlinePlus** database of consumer health information serves as a good starting place for information on these subjects. Key in terms like "terrorism" or "biological weapons" or "chemical weapons" in order to retrieve links to National Library of Medicine pages and other information-rich sites discussing these terms.

<http://search.nlm.nih.gov/medlineplus/>

- ***Health implications of "dirty bombs"***

A variety of Internet resources are available. Choose from authoritative sites, such as the federal government or higher education institutions. A sampling of sites follows:

The **Centers for Disease Control's** FAQ section on Dirty Bombs gives a good definition of a dirty bomb as well as links to other resources:

<http://www.bt.cdc.gov/radiation/dirtybombs.asp>

The **Federal Emergency Management Agency** in the Dept. of Homeland Security has an informational page on what to do during such an event.

[http://www.fema.gov/areyouready/radiological\\_dispersion\\_device.shtm](http://www.fema.gov/areyouready/radiological_dispersion_device.shtm)

The U.S. Nuclear Regulatory Agency has a fact page on the biological impacts of radiation exposure:

<http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/bio-effects-radiation.html>

## CHEMISTRY

- *Endothermic and Exothermic Processes*
- *Organic Chemistry*

**General Chemistry Online** is published and maintained by Dr. Frederick A. Senese, a Ph.D. in Physical Chemistry and Associate Professor in the Department of Chemistry at Frostburg State University in Frostburg, MD. This database-driven site includes over 54 Mb of original content, including interactive tutorials, online quizzes, databases, Flash animations, Chime interactive molecular models, articles, FAQs, and Web site reviews. The site receives 2500-5000 visitors each day and is the recipient of many internationally recognized resources for students and teachers of introductory chemistry.

<http://antoine.frostburg.edu/chem/senese/101/index.shtml>

**All Info About Chemistry** describes the endothermic and exothermic processes and provides clear examples of each.. The More Chemistry Features is a link to articles on other chemistry topics not limited to but including Chemistry Lab Safety Rules and Chemistry Science Fair Project Ideas. This website is published and maintained by Dr. Anne Helmenstine, who has taught chemistry, biology, and physics at the high school level and holds a Ph.D. in biomedical sciences.

<http://chemistry.allinfoabout.com/features/endoexothermic.html>

- *Hazardous Chemicals*

**HSDB (Hazardous Substances Data Bank)**, searchable from National Library of Medicine's homepage in NLM's List of Databases and Resources is a comprehensive, scientifically reviewed, factual database containing records for over 4,800 toxic or potentially toxic chemicals. It contains extensive information in such areas as toxicity, environmental fate, human exposure, chemical safety, waste disposal, emergency handling, and regulatory requirements. The data are taken from a core set of monographs augmented with government documents, special reports, and primary journal literature.

<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB>

\*For links to databases with additional information on this topic see NLM's link to Environmental Health and Toxicology at their homepage.

- *Applications of Nuclear Processes*

**Applications of Nuclear Engineering**, which links directly to University of California Berkeley's Department of Nuclear Engineering, provides a clear and descriptive overview of nuclear processes and its applications.

<http://www.nuc.berkeley.edu/overview/applications.htm>

## SCIENCE APPLICATIONS

- *Science Fair Links*

This webpage, compiled and maintained by high school library media teacher Valerie McCall, provides direct links to numerous science fair project resources found on the World Wide Web. A description of each site is provided, and links are arranged topically and checked frequently for accuracy.

<http://www.kn.sbc.com/wired/fil/pages/listsciencev.html>

## MEDICAL EDUCATION AND CAREER INFORMATION

**MedlinePlus Health Occupations** website which uses the U.S. Department of Labor Bureau of Statistics Occupational Outlook Handbook, professional organizations, and colleges and universities as a resource, provides a significant amount of information about career options in health-related fields. Careers are listed alphabetically and once selected, students can learn about such things the Nature of the Work, Working Conditions, Employment, Training, Other Qualifications and Advancement, Job Outlook, Earnings, Related Occupations and Sources of Additional Information.

<http://www.nlm.nih.gov/medlineplus/healthoccupations.html>

## COLLEGE PROFILES

The **Association of American Medical Schools** provides a listing of the 125 accredited U.S. Medical Schools as well as the 17 accredited Canadian Medical Schools, along with information on admissions requirements, curriculum, and how the medical schools compare.

<http://www.aamc.org/medicalschoools.htm>

The **Associations of Schools of Allied Health Professions** maintains a Web site with links to the professional bodies that make up the Allied Health field. This is a good place to begin your college search.

<http://www.asahp.org/links.htm>

Links to other information resources can be found at the **National Library of Medicine's** FAQ section on medical education and careers.

<http://www.nlm.nih.gov/services/medicaled.html>

## **Appendix**

### **Criteria for Evaluating Internet Sites**

#### **Accuracy**

Is the information reliable and with no mistakes?

Is there an editor or someone who verifies the information?

#### **Authority**

Is there an author?

Is the author an expert? Does he have qualifications?

Who is the sponsor?

Is the sponsor of the page reputable?

Is there a link to information about the author or the sponsor?

If the page does not have this information is there any other way to determine its origin? (look at the URL or the domain)

#### **Objectivity**

Does the information show bias?

Is the page designed to sway opinion? Is there any advertising on the page?

#### **Currency**

Is the page dated?

If so when was the last update?

Are the links still current?

#### **Coverage**

What topics are covered?

What does this page offer that is not found elsewhere? How in depth is the information?

How valuable is the information?